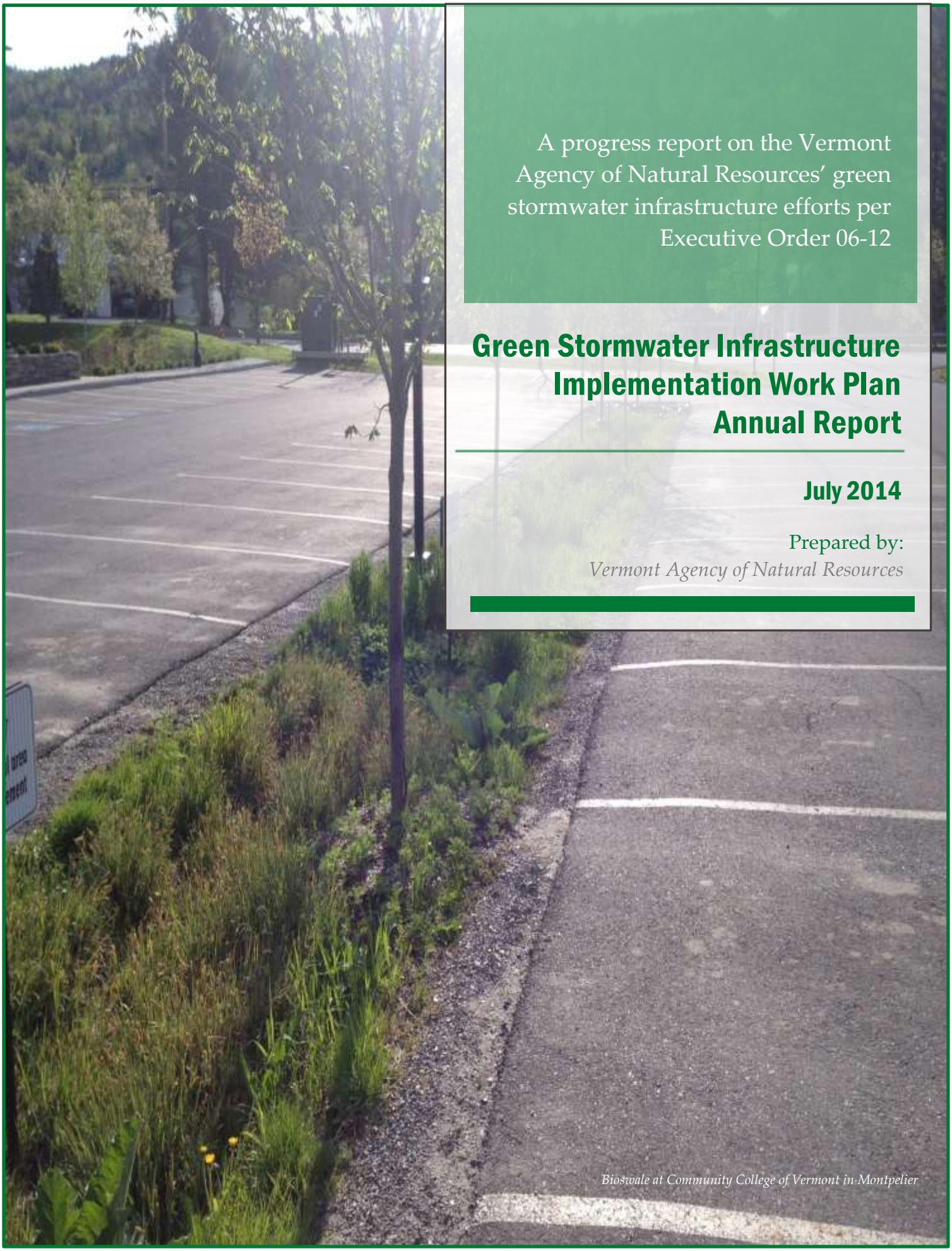

A progress report on the Vermont Agency of Natural Resources' green stormwater infrastructure efforts per Executive Order 06-12

Green Stormwater Infrastructure Implementation Work Plan Annual Report

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Executive Summary

Green stormwater infrastructure (GSI) represents an innovative and beneficial means by which to manage stormwater runoff. Executive Order 06-12 called upon the Agency of Natural Resources, along with other agencies, to identify and seize opportunities to promote, demonstrate, and implement GSI. In July 2013, ANR submitted to the Governor an agency-specific GSI Implementation Work Plan that documented the steps ANR would take to fulfill this charge. The following outlines in broad strokes ANR's first year accomplishments. Such accomplishments include:

- Beginning the process of updating the Vermont Stormwater Management Manual to include a wider array of GSI practices;

- Hosting a wide variety of workshops, webinars, and trainings for a diverse group of stakeholders including citizens, professionals, municipalities, and state employees;

- Incorporating GSI into the design of two major rehabilitation projects in Vermont State Parks;

- Providing funding for GSI design and implementation through the Ecosystem Restoration Program and Watershed Grants;

- Assisting in the coordination of the Green Infrastructure Roundtable and the development of the Vermont Green Infrastructure Strategic plan 2014 – 2019; and

- Working closely with the Agency of Commerce and Community Development, Department of Buildings and General Services, and the Vermont Agency of Transportation to identify collective GSI opportunities.

Introduction

With the signing of Executive Order 06-12 by Governor Shumlin in 2012, the State of Vermont recognized the important role that green stormwater infrastructure (GSI) plays in enhancing and protecting water quality. Stormwater runoff is a significant source of nonpoint pollution and GSI provides a mechanism through which that runoff volume and quality can be managed in a sustainable way using natural processes. In addition, GSI also provides myriad other benefits such as carbon sequestration, economic vitality, improved air quality, and aesthetic quality. Unfortunately, GSI is a fairly new concept in Vermont and faces many barriers to statewide adoption and implementation including a low level of awareness, a lack of technical details, limited incentives, and regulatory barriers at the local and state level.

The Agency of Natural Resources (ANR) and its fellow agencies made an effort to overcome many of these barriers through the development of Agency-specific five-year Implementation Work Plans. The Work Plans identify the tasks each Agency will take to promote GSI within its ranks. Since the finalization of the Work Plans in July 2013, ANR has made steady progress toward achieving its individual goals.

Much credit is due to the administration for their support in identifying GSI's role as a priority towards sustainability, and to Green Infrastructure Coordinator Justin Kenney in the Department of Environmental Conservation. Mr. Kenney is coordinating ANR's efforts to raise the level of awareness, identify needs and opportunities, and institutionalize GSI in policy, procedures and practice within ANR, other state agencies and the many partners statewide. ANR has worked over the past year to embed these principles into a multitude of programs and initiatives, and to act as a role model on its own properties.

It is evident that the role of GSI will only expand in future years as the State faces increased challenges associated with extreme weather patterns and as it works to identify and act on opportunities to limit nonpoint source pollution loads to receiving water bodies such as Lake Champlain. GSI is keystone to Vermont's adaptation planning and implementation efforts as we strive to balance our impacts on natural resources, improve social capital and economic vitality, and maximize the myriad of benefits natural systems provide.

ANR is forging a progressive way forward, but more work needs to be done to reach our desired future condition where GSI plays center stage. This document provides a brief review of the major accomplishments by ANR to date and adds additional detail to the items listed in the ANR Implementation Work Plan Task List. ANR looks forward to working on these tasks and becoming a role model for sustainable development and stormwater management.

Fiscal Year 2014 Recap

Institutionalizing GSI within ANR

The scope and breadth of ANR's work is quite vast and the number of staff working for the Agency is very large. For these reasons, it can be difficult to institutionalize a new idea or concept. Regardless, ANR has made some great strides towards incorporating GSI into its existing programs and initiatives.

The Vermont Department of Environmental Conservation (DEC) has had great success institutionalizing GSI, particularly in the Watershed Management Division (WSMD). The Ecosystem Restoration Program (ERP) released a set of **Stormwater Master Planning** (SWMP) Guidelines in May 2013. SWMP is a flexible process through which entities identify, describe, and prioritize the actions necessary to protect a watershed from stormwater related impacts. SWMP can be done at many different scales and vary in their level of complexity based on the level of information available. The guidelines document nine different SWMP templates, two of which specifically focus on GSI. Since the release of those guidelines, ERP staff has been encouraging communities and watershed groups to undertake SWMP, specifically if it will lead to identification of GSI opportunities.

Through **Tactical Basin Planning**, the Monitoring, Assessment, and Planning Program (MAPP) developed a more effective planning and implementation mechanism to manage surface waters across the state. Tactical Basin Planning focuses on high priority project identification, development, and implementation in geographically specific locations based on comprehensive monitoring, assessment, and analytical data. More and more, GSI opportunities are being identified through the Tactical Basin Planning process. The Otter Creek, South Lake Champlain, Missisquoi, Deerfield and Lower Connecticut, and Passumpsic and Upper Connecticut Tactical Basin Plans all include specific GSI strategies including the evaluation of GSI for combined sewer overflow (CSO) abatement, the installation of green streets, and the use of GSI retrofits.

The Stormwater Program administers a post-construction stormwater permit pursuant to state statute. Regulated projects are required to implement BMPs in accordance with the **Vermont Stormwater Management Manual** (VSMM). The VSMM was initially developed by the Center for Watershed Protection, and is currently undergoing revision to increase the use of green-stormwater infrastructure practices. DEC is currently mid-way through the contractor-assisted stakeholder process to develop those revisions. Although the final framework is yet to be determined, it is expected that low impact development (LID) principles and GSI practices will need to be considered before traditional stormwater management practices can be used.

During the development of the **Lake Wise Program** and the **Vermont Shoreland Protection Act**, the Lakes and Ponds Program placed a strong emphasis on protecting lakeshores through LID and managing stormwater runoff with GSI. Under new regulations, effective July 1, 2014, best management practices, such as rain gardens and vegetated areas, may be required as a permit condition under certain circumstances where expansions of existing development within the Protected Shoreland Area are proposed. Where a permit is not necessary, similar practices will be encouraged on a volunteer basis.

The Drinking Water & Groundwater Protection Division (DWGWPD) has worked with the Green Infrastructure Coordinator on several topics this past year. Of particular interest is the development of new **installer training and certification programs**. There is ongoing discussion about expanding a basic onsite wastewater installer certification to include GSI as a separate module. A future vision includes an additional shoreland protection module that would ultimately provide a framework for a Department-wide certification program. As an initial step, DWGWPD assigned credits and posted training workshops on GSI for Licensed Designers. In addition to this, DWGWPD also began developing new isolation distances to various GSI and stormwater structures for the draft **Wastewater System and Potable Water Supply Rules** currently in development.

The Vermont Department of Forests, Parks, and Recreation (FPR) placed a high priority on GSI in their State Parks and Recreation Program. Vermont State Parks is incorporating GSI into two major rehabilitation projects initiated in FY 2014. State Parks will demonstrate that GSI is a sustainable method to reduce impact of necessary shoreland development. During the 2013 summer season, waterfront State Parks inspired over 690,000 visits by people of all backgrounds for the positive experience of recreating in, on, and around the waters of the State.

The redevelopment of the beach area at **Bomoseen State Park** will incorporate GSI into the existing parking areas as well as the grassed beach area itself. Recognizing that heavily trafficked turf provides less treatment than desired, the lawn is being reshaped to drain toward GSI demonstration "gardens" at each end. The gardens will capture the water that does not enter the soil, define the ends of the beach and illustrate GSI at work to park visitors. The **Alburgh Dunes State Park** design includes low impact development (LID) and GSI to not only reduce runoff but capture and retain what is created. Between these two locations, countless citizens and visitors will see GSI at work and continue to experience the benefits of GSI through water-based recreation

The Vermont Department of Fish and Wildlife (FW) has also made progress on institutionalizing GSI. The new **John Guilmette Fishing Access Area** is being designed to utilize bioswales, grass channels, bioretention, and vegetation to treat stormwater runoff. Once complete, elements of the project will be showcased at the States Organization for

Boating Access conference in 2015. The project will serve as a model for other access areas in Vermont and around the country.

Building Statewide Capacity

ANR relies heavily on staff and partners to achieve its mission and goals. In order for these entities to be successful, they must have a certain level of knowledge and skill. This is particularly true in relation to our GSI efforts, which are being undertaken at the individual, institutional, and societal level. Raising the level of knowledge and skill has been a major focus of ANR this past year.

Workshops, trainings, and webinars are a critical component of our capacity building efforts. All told, GSI was a topic in over 23 different presentations this past year, reaching over 1,000 people. These presentations include, but are not limited to:

- Two webinars on valuing and quantifying GSI
- Two webinars on modeling GSI using i-Tree
- One workshop on soils
- Three talks to educational institutions (Montpelier High School, Bellows Free Academy, Vermont Technical College)
- Two talks to municipal entities (Montpelier Conservation Commission, Swanton Planning Commission)
- Four presentations at large conferences/events (Municipal Day, Downtown Conference, Green Mountain Water Environment Association Fall Conference, Green and Sustainable 2013)
- One interagency training (ANR, BGS, VTrans)

Technical assistance and partner support is another critical component. For the past year, the Green Infrastructure Coordinator, in collaboration with other ANR staff, has handled much of this work. This position worked closely with a variety of entities including municipalities, citizens, non-profit organizations, professionals, and other state agencies. The Coordinator assisted with bylaw revisions, provided technical specifications, identified funding opportunities, coordinated trainings and workshops, assisted with project development, and pulled in relevant staff on various projects and initiatives as necessary.

Providing **general information** is also important. In the fall of 2013, the Green Infrastructure Initiative, which is a program within ERP, released a series of 13 informational factsheets. These factsheets cover the core principles and concepts behind LID and GSI. The content is easily understood and helps ensure not only a baseline level of understanding, but also consistency of terminology and message. In addition to the fact sheets, the Green Infrastructure Initiative contributed at least eight articles to the WSMD blog. Fact sheets, and other relevant information, are available on the Vermont Green Infrastructure webpage.

Very little of this work would be accomplished without **funding**. Funding supports not only the implementation of projects but also all the necessary steps to get there. Currently, ERP is the primary source of funding for GSI efforts. In 2014, ERP funds were used to directly support the Vermont Stormwater Management Manual revision process, multiple high priority GSI design and implementation projects through a competitive grant round, and at least three separate trainings. ERP funds were also used to leverage federal funding from the United States Forest Service in support of the Green Infrastructure Coordinator position.

Working Together

Long-term, ANR hopes that GSI becomes an integral component of efficient stormwater management and is promoted, supported, and utilized at a local, regional, and statewide scale. This will only happen with close coordination and strong communication both internally and externally.

Earlier this year, a **Green Infrastructure Work Group** was formed within ANR that includes staff from a number of different Departments and Programs. The purpose of the Work Group is to oversee ANR's GSI Implementation Work Plan. The Group had its first meeting on April 2, 2014 to review the plan and discuss new opportunities for including GSI in additional Agency programs. The Work Group is an important vehicle for communication and coordination within the Agency.

Additional internal coordination happens directly at the Program level on a project-by-project basis. Since the Green Infrastructure Coordinator serves as the point person for all matters GSI related, many Program staff sought guidance from the Coordinator and vice versa. For this reason, the Coordinator was able to step away from day-to-day Program logistics and think about the bigger picture, many times finding connections between Programs that wouldn't normally be apparent.

The **Green Infrastructure Roundtable** continues to be a powerful tool for bringing together a diverse group of internal and external stakeholders. The Roundtable is coordinated by ANR and met in-person on a quarterly basis. Roughly, 20 people participated directly in the Roundtable and another 115 were involved through the Roundtable Google Group. The Roundtable assisted ANR in developing the Vermont Green infrastructure Strategic Plan: 2011 – 2013 and will soon finalize a plan for 2014 – 2019, which will guide their efforts moving forward. The Roundtable also provided guidance to the Green Infrastructure Coordinator regarding annual work plans and priorities. In many cases, Roundtable members actively took on high priority projects. The Vermont Association of Development and Planning Agencies (VAPDA), for example, is working on a project involving municipal bylaw review and stormwater toolkit generation.

ANR also coordinates the **Interagency Green Infrastructure Council**, which resulted from Executive Order 06-12 and includes representation from the Agency of Commerce and Community Development (ACCD), ANR, the Department of Buildings and General Services (BGS), and the Agency of Transportation (VTrans). The Council met quarterly to review annual Implementation Work Plans and discuss opportunities for greater collaboration. The Council is a fruitful endeavor that has led to some great cooperation, specifically in regards to training and project identification/prioritization.

Updated Implementation Work Plan Task List

In fiscal year 2015, ANR will continue to promote, demonstrate, and implement GSI by undertaking the following tasks.

Task	Task Description	Progress to Date
1	Review current regulatory barriers to GSI and consider revisions where appropriate. • Stormwater Management Manual • Wastewater System and Potable Water Supply Rules • Combined Sewer Overflow Policy • Underground Injection Control • Act 250	- VT Stormwater management manual update underway - CSO policy update underway - Coordination with DWGWPD
2	Consider the role that GSI plays in the development of reasonable assurances and implementation of total maximum daily loads (TMDLs). • Research the use of GSI in other states to meet regulatory requirements (tree credits, stream restoration, and others) • Provide input into Lake Champlain Phase 1 and Phase 2 plans	- LID and GSI included in Lake Champlain Phase 1 draft
3	Review existing state programs, processes, and initiatives and develop a plan for incorporating GSI concepts. • Surface Water Management Strategy • Tactical Basin Planning • Stormwater Master Planning • Corridor Planning • Lake Wise Certification Program • NPS Management Program • On-site Installer Certification • Climate Cabinet • Flood Ready Vermont	- Revisions to Surface Water Management Strategy underway - Tactical Basin Planning and Stormwater Master Planning processes include consideration of GSI - Lake Wise Certification Program promoting voluntary use of GSI - Initial conversations with DWGWPD about on-site installer certification program
4	Consider incorporation of GSI concepts as appropriate when developing and implementing new programs.	- Discussion about role of GSI in expanded State Revolving Fund - GSI intern secured through DEC/University of Vermont (UVM) Internship Program

5	Provide training opportunities to ANR staff and external partners to increase knowledge of GSI. • Annual conference/workshop • Webinars • Presentations	- Five webinars - Three talks to educational institutions - Three talks to municipal groups - Six presentations at conferences - Four workshops - One interagency training - One stormwater tour
6	Investigate the modification and development of funding sources to support the utilization of GSI. • 604(b) • ERP • State Revolving Fund • Watershed Grants • Water Quality Improvement Fund	- Initial discussions about incentivizing GSI through ERP funding - Initial discussions about expanding SRF to support more GSI implementation
7	Identify gaps in technical information and guidance and develop a plan for creating additional resources. • Gather additional BMP cost, benefit, and performance information and make it readily available • Work with partners to develop Vermont specific resources	- 13 informational fact sheets created - Technical guidance posted to Green Infrastructure Google Group - Coordination with the Vermont Association of Planning and Development Agencies (VAPDA) on municipal toolkit
8	Support additional research and monitoring opportunities related to GSI. • Tie in with existing efforts such as the Monitoring Strategy Implementation Team and the Vermont Water Quality Monitoring Council. • Work closely with Vermont institutions to develop and gather Vermont specific data	- ERP staff involved in Steering Committee for UVM Bioretention Laboratory
9	Seek opportunities for greater inter-agency and intra-agency collaboration and cooperation. • GI Council • GI Work Group	- Shared resources such as technical documents and webinars - Identified future training opportunities - Multi-agency support for GSI workshop - Inter-agency and intra-agency project support

10	Develop a process for auditing GSI on ANR owned and managed lands (e.g. State parks, wildlife management areas, and fishing access areas) and explore opportunities to enhance or utilize additional GSI. • Discuss GSI concepts with ANR Lands Team • Collaborate on capital improvement projects • Leverage experience form other agencies	- Initial discussions with ANR Lands Team about GSI led to involvement by GI Coordinator in Flood Resiliency Scoping Project - GSI assessment protocols developed in New York and Maryland researched and documented - GI Coordinator involved in FPR and FW capital improvement projects
11	Review GSI components and develop a list of appropriate uses based on land type and land use. • Lakes and ponds • Wetlands • Floodplains • Source protection areas	- Appropriate GSI practices identified as Lake Wise Best Management Practices
12	Increase coordination between Facilities Engineering Division (FED), Stormwater, Wastewater Management, and MAPP in regards to CSO projects. • Bring appropriate parties together during the preliminary engineering phase for CWSRF projects • Update CSO policy	- Initial meeting of parties hosted by FED - Update of CSO scheduled
13	Increase collaboration among and capacity of external stakeholders. • Hold quarterly Roundtable meetings • Review and track progress on Strategic Plan • Support Strategic Plan related efforts • Increase participation in Roundtable	- Roundtable meetings held on 06/11/13 09/17/13, 01/28/14 and 05/28/14 - 2011 – 2013 Strategic Plan progress report drafted - 2014 – 2019 Strategic Plan drafted - Roundtable participation over 130
14	Assist external partners in efforts to provide GSI assistance, outreach, and training to municipal entities, private landowners, and design professionals.	- GI coordinator assisted with rain barrel workshops, realtor workshops, project development and implementation, residential stormwater audits, trainings, project design, and coordination

15	Revisit GSI Implementation Work Plan and review progress. • Add additional challenges and opportunities as necessary • Continue to assume leadership role on Interagency GSI Council.	- Annual progress report submitted July 2014 - GSI Council Meetings held 07/30/13, 10/30/13, 01/30/14, 05/01/14, and 06/17/14

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